

Overweight in Children

AHA Recommendation

Overweight children are more likely to be overweight adults. Successfully preventing or treating overweight in childhood may reduce the risk of adult overweight. This may help reduce the risk of heart disease and other diseases.

When defining overweight in children and adolescents, it's important to consider both weight and body composition.

Among American children ages 2–19, the following are overweight or obese, using the 95th percentile or higher of body mass index (BMI) values on the CDC 2000 growth chart:

- For non-Hispanic whites, 31.9 percent of males and 29.5 percent of females.
- For non-Hispanic blacks, 30.8 percent of males and 39.2 percent of females.
- For Mexican Americans, 40.8 percent of males and 35.0 percent of females.

The prevalence of overweight (BMI-for-age values at or above the 95th percentile of the 2000 CDC growth charts) in children ages 6–11 increased from 4.0 percent in 1971–74 to 17.0 percent in 2003–06. The prevalence of overweight in adolescents ages 12–19 increased from 6.1 percent to 17.6 percent. (NHANES, NCHS)

How do you prevent and treat overweight in children?

Reaching and maintaining an appropriate body weight is important. That's why recommendations that focus on small but permanent changes in eating may work better than a series of short-term changes that can't be sustained.

- Reducing caloric intake is the easiest change. Highly restrictive diets that forbid favorite foods are likely to fail. They should be limited to rare patients with severe complications who must lose weight quickly.
- Becoming more active is widely recommended. Increased physical activity is common in all studies of successful weight reduction. Create an environment that fosters physical activity.
- Parents' involvement in modifying overweight children's behavior is important. Parents who model healthy eating and physical activity can positively influence their children's health.

In treating most overweight children, the main emphasis should be to prevent weight gain above what's appropriate for expected increases in height. This is called prevention of increased weight gain velocity. For many children this may mean limited or no weight gain while they grow taller. Recommendations for maintaining weight should include regular physical activity and careful attention to diet to avoid too many calories. Factors predicting success are:

- including parents in the dietary treatment program
- strong social support of dietary intervention from others involved in preparing food
- regular physical activity prescription including social support

The importance of continuing these lifestyle changes well past the initial treatment period should be emphasized to the entire family. The healthiest way to change weight is gradually.

How is body fat measured?

The **body mass index** (BMI) formula assesses weight relative to height. It provides a useful screening tool to indirectly measure the amount of body fat. Weight in kilograms is divided by height in meters squared (kg/m^2), or, multiply weight in pounds by 703, divide by height in inches, then divide again by height in inches. In children, the Centers for Disease Control and Prevention defines BMI-for-age at or above the 95th percentile as being overweight. It is important to assess the trend of the child's BMI as this is an indirect measure of body fat.

The CDC recommendations for screening and assessing for obesity and overweight in children and adolescents mention the use of the triceps skinfold test for further evaluation when the BMI-for-age is assessed above the 95th percentile. Importantly, while triceps skinfold thickness can be unreliable, evidence suggests that children and adolescents assessed to have a skinfold measure greater than the 95th percentile are more likely to have excess body fat as opposed to increased lean body mass or large frame size.

The Costs of Obesity

Fact Sheet

Children

- Children treated for obesity are roughly three times more expensive for the healthcare system. (Thomson and Medstat, *Childhood Obesity: Costs, Treatment Patterns, Disparities in Care.* 2006)
- In 2006, total health care spending for children diagnosed with childhood obesity is estimated at \$750 million a year. (Thomson and Medstat, *Childhood Obesity: Costs, Treatment Patterns, Disparities in Care.* 2006)
- The costs of obesity exceed \$100 billion a year in children and adults which represents about 6% of total health care costs.
 - This number is only projected to increase with current skyrocketing trends of obesity in children and adults. (Wolf AM, Colditz GA. Current estimates of the economic cost of obesity in the United States. *Obesity Research* 1998; 6: 97-106)
- Overweight adolescents have a 70% chance of becoming overweight adults.
 - Overweight adolescents have an 80% chance of becoming overweight adults if one or more parent is overweight or obese. ("The Problem of Overweight in Children and Adolescents." DHHS Fact Sheet. January 2007.)
- Annual health expenditures for an overweight child are \$72 higher than for a healthy-weight child.
 - These costs are expected to increase as a child ages and develops increased health problems. (Eastabrooks, P.A. and Shetterly, S., "The prevalence of health care use of overweight children in an integrated health care system," *Archives of Pediatrics and Adolescent Medicine* 161, no. 3 (2007): 222-227.)

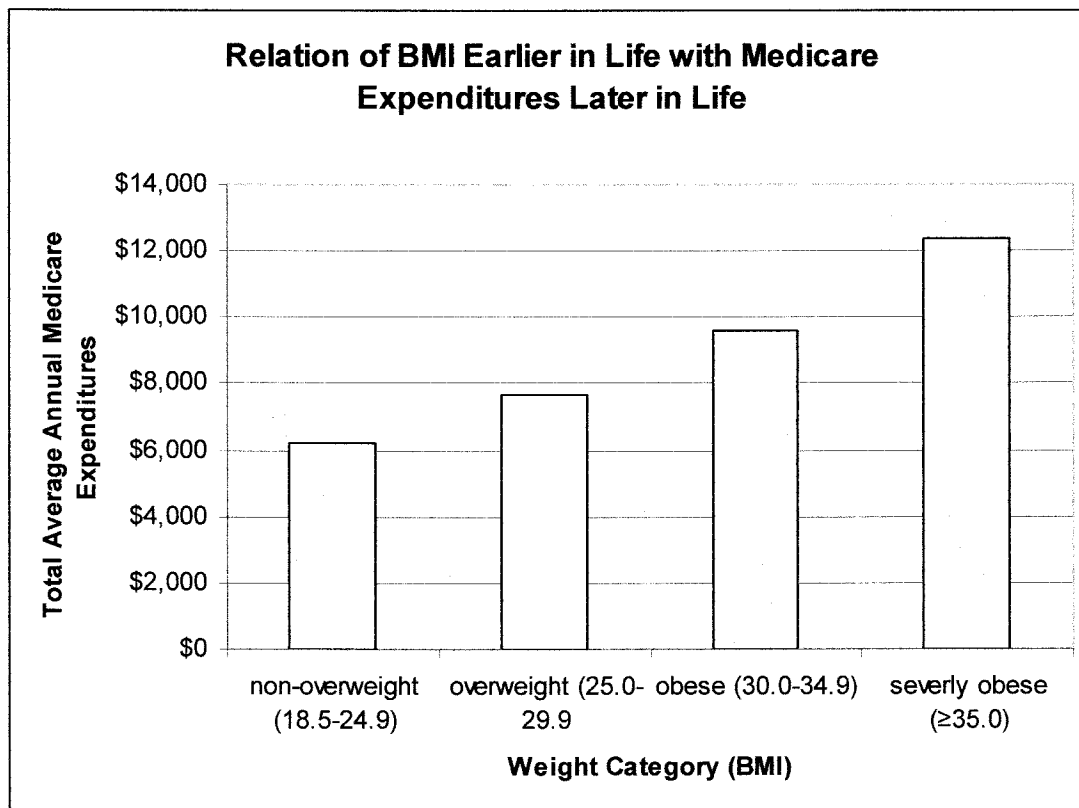
Adults

Total Health Care Spending Related to Obesity

- US health expenditures are projected to exceed \$4 trillion by 2016. (*Health Affairs*)
- Between 1987 and 2002, the share of private health spending attributable to obesity soared, from \$3.6 billion (2% of total) in 1987 to \$36.5 billion (11.6% of total) in 2002. (Thorpe, Kenneth et al. The Rising Prevalence Of Treated Disease: Effects On Private Health Insurance Spending. *Health Affairs*. June 2005)
- Treatment vs. prevention
 - Average charge for a coronary bypass - \$83,919 (2003 NCUP data Heart Disease and Stroke Statistics - 2007 Update)
 - Average charge for laparoscopic bariatric surgery (Roux-en-Y)- \$17,660 (Paxton and Matthews, *Obesity Surgery*, 2005)
 - Average charge for 3 sessions with a RD - \$180 (U.S. DHHS 2001, David Ludwig Ph.D. estimate)
- Obesity-related costs exceed costs attributable to smoking and problem drinking. (Sturm, The Effects Of Obesity, Smoking, And Drinking On Medical Problems And Costs. *Health Affairs*, March/April 2002; 21(2): 245-253)
- The current indirect and direct costs of treating obesity have been estimated at \$117 billion per year. (Heart Disease and Stroke Statistics. American Heart Association. 2007)
- 9.1% of annual medical spending for adults can be attributed to the overweight and obese. (Roland Sturm, The Effects Of Obesity, Smoking, And Drinking On Medical Problems And Costs *Health Affairs*, March/April 2002; 21(2): 245-253). and Finkelstein, *Health Affairs*, July/August 2003; Web Exclusive)
- Mean annual health care costs for adults:
 - Normal weight: \$3,254
 - Overweight: \$3,202
 - Moderately obese: \$3,924
 - Severely obese: \$5,695
 - The costs for severely obese adults are 75% more than their peers of normal weight (Thomson Healthcare. "Obesity in the Workforce" April 2007)
- A typical obese adult will generate more medical costs each year than a person 20 years older of normal weight. (Sturm, The Effects Of Obesity, Smoking, And Drinking On Medical Problems And Costs. *Health Affairs*, March/April 2002; 21(2): 245-253)
- The costs of obesity were found to be 36% higher for medical and 77% higher for pharmacy-related costs. (Sturm, The Effects Of Obesity, Smoking, And Drinking On Medical Problems And Costs. *Health Affairs*, March/April 2002; 21(2): 245-253)
- Indirect costs associated with obesity include lower productivity, increased absenteeism and higher life and disability insurance premiums.
 - On average, a male employee with a BMI exceeding 30 costs \$670 more annually than a male of normal weight; obese females cost \$1,200 more annually than normal weight females. (Sturm, The Effects Of Obesity, Smoking, And Drinking On Medical Problems And Costs. *Health Affairs*, March/April 2002; 21(2): 245-253)
- The obese can expect 4.0 disability-free life years-the lowest disability-free life expectancy of any group. (Lakdawalla et al., The Health And Cost Consequences Of Obesity Among The Future Elderly, *Health Affairs*, September 2005; R30-41)

Medicare and Medicaid: Costs

- A study found obese Medicare patients annual expenditures were 15 percent higher than normal or overweight patients. (Anderson, Louise H. et al., "Health Care Charges Associated with Physical Inactivity, Overweight, and Obesity." *Preventing Chronic Disease* 2:4 (October 2005))
- Individuals who are severely obese earlier in life have total average annual Medicare expenditures of \$12,342 later in life, compared to individuals who are normal weight earlier in life who have annual average Medicare expenditures of \$6,224. (Daviglius, M.L. et al., "Relation of body mass index in young adulthood and middle age to Medicare expenditures in older age," *JAMA* 292, no. 22 (2004): 2743-2749.)



Obesity Costs in a Kaiser Permanente Patient Population

Private Insurance: Costs

- For adults in the Kaiser Permanente Colorado system, the median annual expenditure of obese patients was \$585.44, compared to \$333.24 for non-obese patients. (Raebel, M.A. et al., "Health services use and health care costs of obese and non-obese individuals," *Archives of Internal Medicine* 164, no. 19 (2004): 2135-2140.)
- During the past decade, Unum Provident, the UK's largest disability carrier, reported a ten-fold increase in the incidence of obesity-related disability claims.
 - The average annual healthcare costs for a disabled, obese individual is \$51,023 (\$30,567 medical + \$8,720 disability payments + \$11,736 mo-morbid medical costs). (UnumProvident, 2004 Press Release, site visited 7.26.07:

http://www.unum.co.uk/Home/Corporate_Information/Press_Releases/Press_Releases_2004.htm)

- In 2000 alone, physically inactive members cost Blue Cross and Blue Shield of Minnesota (BCBSMN) \$83.6 billion (\$56 per member).
 - Almost one third of costs related to heart disease, stroke, colon cancer, and osteoporosis in the BCBSMN population were attributable to physical inactivity. (Garrett, N.A. et al., "Physical inactivity: Direct cost to a health plan," *American Journal of Preventive Medicine* 27, no. 4 (2004): 304-309.)

Obese Workforce

- Researchers found that obese workers had:
 - 183.63 lost workdays per 100 full time employees, compared to normal weight workers who had 14.19 lost workdays per 100 full time employees. (Ostbye, T. et al., "Obesity and workers' compensation: Results from the Duke Health and Safety Surveillance System," *Archives of Internal Medicine* 167, no. 8 (2007): 766-773.)
- Excessive weight and physical inactivity negatively impact:
 - Quality of work performed,
 - Quantity of work performed and;
 - Overall job performance among obese, sedentary individuals. (Pronk, N.P. et al., "The Association between Work Performance and Physical Activity, Cardiorespiratory Fitness, and Obesity," *Journal of Occupational and Environmental Medicine* 46, no. 1 (2004): 19-25.)
- On average, obese workers have up to 21 percent higher health care costs compared to normal weight employees.
 - It is estimated that in 1994, obesity cost U.S. businesses \$12.7 billion, of which physical inactivity accounted for \$7.7 billion. (Ostbye, T. et al., "Obesity and workers' compensation: Results from the Duke Health and Safety Surveillance System," *Archives of Internal Medicine* 167, no. 8 (2007): 766-773.)

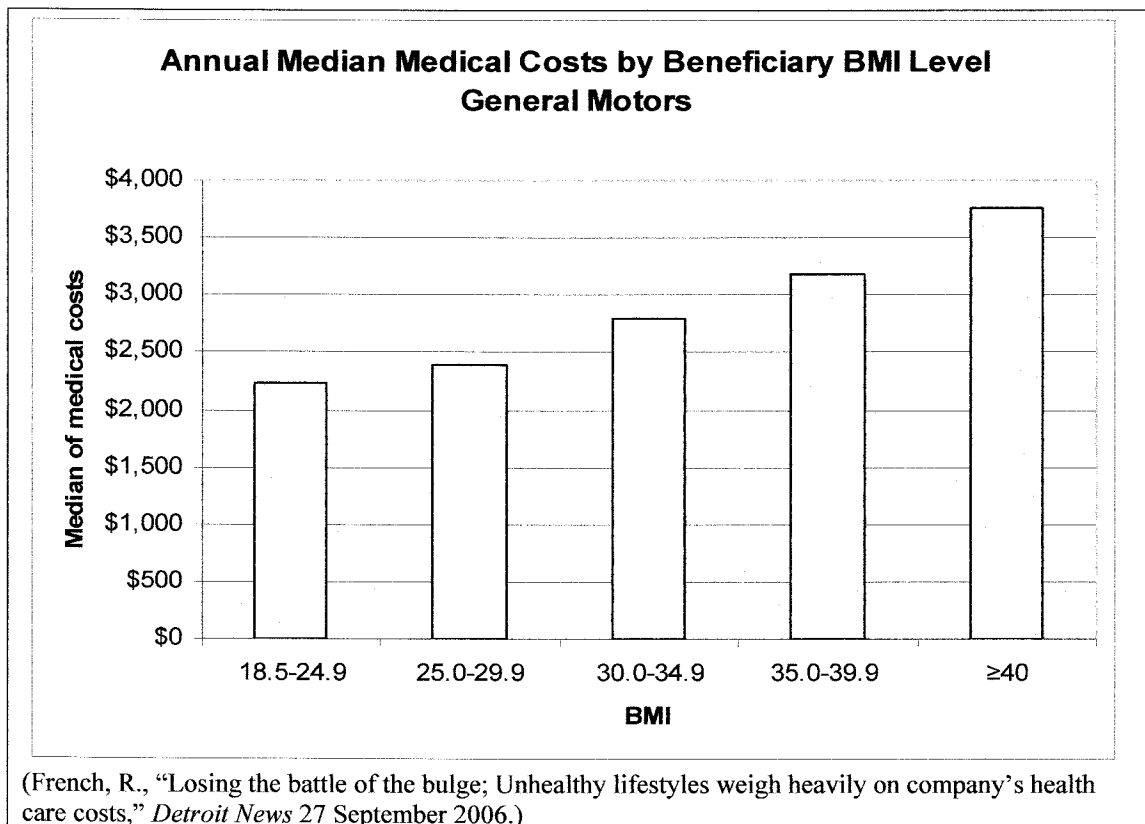
Workers' Compensation Claims

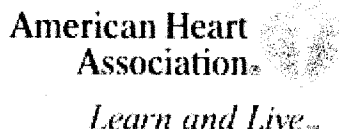
- Excessive weight gain among employees is related to increased workers' compensation claims. (Xiang, H. et al., "Obesity and risk of nonfatal unintentional injuries," *American Journal of Preventive Medicine* 29, no. 1 (2005): 41-45.)
- Obese workers have, on average:
 - 11.65 claims per 100 full time employees, compared to normal weight employees who had 5.80 claims per 100 full time employees. (Ostbye, T. et al., "Obesity and workers' compensation: Results from the Duke Health and Safety Surveillance System," *Archives of Internal Medicine* 167, no. 8 (2007): 766-773.)
- Obese employees have:
 - \$51,091 in medical claims costs per 100 full time employees, compared to only \$7,503 in medical claims costs for normal weight workers.
 - \$59,178 in indemnity claims costs per 100 full time employees, compared to only \$5,396 in indemnity claims costs for normal weight employees. (Ostbye, T. et al., "Obesity and workers' compensation: Results from the Duke Health

and Safety Surveillance System," *Archives of Internal Medicine* 167, no. 8 (2007): 766-773.)

Case Study in Obesity Costs: General Motors

- Twenty-six percent of GM's 1.1 million union beneficiaries are obese. (Tolles, B., "Obese weigh down U.S. economy," *Daily Northwestern* 5 May 2005.)
- Obesity cost the company \$286 million in 2004 alone. (Tolles, B., "Obese weigh down U.S. economy," *Daily Northwestern* 5 May 2005.)
 - Of the \$5.3 billion GM spent on medical costs in 2005, an estimated 25 percent was due to unhealthy habits such as overeating, lack of exercise, cigarettes and alcohol. (French, R., "Losing the battle of the bulge; Unhealthy lifestyles weigh heavily on company's health care costs," *Detroit News* 27 September 2006.)
- A 2003 study found that among GM beneficiaries (employees, retirees, and their adult dependents), extremely obese (BMI \geq 40) individuals had:
 - Annual median medical costs of \$3,753, compared to normal weight individuals ($18.5 \leq \text{BMI} \leq 24.9$) who had annual median medical costs of \$2,225 (a striking difference of \$1,528). (Wang, F. et al., "The relationship between National Heart, Lung and Blood Institute weight guidelines and concurrent medical costs in a manufacturing population," *American Journal of Health Promotion* 17, no. 3 (2003): 183-189.)
- Overall, annual median medical costs increased as BMI level of beneficiaries grew (see graph below).





In Support of HB 474 (McAlpin) BMI Program in Grades 3-12

House Education Committee 2/16/2009

Children with heart disease risk factors should get preventive treatment

Abstract 3841/P3

CHICAGO, Nov. 12 — Children with risk factors such as high blood pressure, obesity, diabetes and high cholesterol levels already show signs of fatty build-up in their arteries that could lead to heart attack in adulthood, researchers reported at the American Heart Association's Scientific Sessions.

"Primary prevention of heart disease must start in childhood," said Sanaz Piran, M.D., internal medicine resident at McMaster University in Hamilton, Ontario, Canada. "We need to start looking at and treating risk factors for heart disease in children."

Researchers reviewed 26 studies from the United States, the Netherlands, Australia, Finland, Norway and Italy that used non-invasive methods to measure the thickness of the artery walls and blood flow in arteries of children without risk factors, as well as in children with risk factors for cardiovascular disease.

Researchers used ultrasound in three of the studies to examine stiffness in the artery wall. They measured carotid artery intima-media thickness (CIMT), an ultrasound measurement of the thickness of the neck arteries, to determine the level of atherosclerosis. They found that children with risk factors for heart disease and stroke had an average of 8.7 percent more thickening than children without risk factors. Atherosclerosis is the fatty build-up of plaque in the inner walls of the arteries. It can lead to heart attack or stroke.

Another noninvasive test — brachial or femoral artery flow-mediated dilation (FMD) — showed an average 37 percent decreased blood flow in children with risk factors compared to those without. FMD measures endothelial dysfunction, which occurs when blood vessels aren't flexible enough to expand in response to increased blood flow. In FMD, the flow of blood either in the arm or thigh is gauged with ultrasound after a cuff is inflated and deflated. FMD is a validated measure of early atherosclerosis.

"These results indicate structural abnormalities and artery wall dysfunction, both signs of the early stages of atherosclerosis," Piran said. "Children with risk factors are showing the markers for sub-clinical atherosclerosis."

The 26 studies included 3,630 children, age 5 to 18, and compared healthy children to children with cardiovascular risk factors such as high blood pressure, high cholesterol levels, diabetes and obesity.

In 15 studies, researchers measured the children's CIMT and in eight studies either arm or thigh artery FMD. Thickening of the carotid artery wall is an early sign of atherosclerotic disease that could indicate a higher risk of stroke or disease elsewhere in the body's arteries, which means a higher risk of heart disease.

Twelve of 15 studies with CIMT showed that the artery wall thickness was higher in children with risk factors. All eight studies testing FMD showed that subgroups of children with risk factors had reduced dilation (expansion) of the artery. Three other ultrasound studies showed that children with risk factors were more likely to have arterial stiffness in neck arteries.

The research highlights the need for parents and physicians to target cardiovascular risk factors in children, Piran said.

"Diet and exercise are especially important to curb the escalating problem of childhood obesity," she said. "Obesity puts children at risk for high blood pressure, diabetes and high cholesterol levels. Children's diets have changed dramatically, influenced by television commercials and the convenience of fast foods. Children are eating too many fatty and processed foods. Parents need to involve their kids in regular exercise activities and cut down on fatty meals, emphasizing healthy foods such as vegetables."

Piran also suggested that parents who smoke should not smoke in the presence of their children. And if there is a family history of elevated cholesterol, then children in the family should have their cholesterol levels checked.

"The very things we recommend to adults should be recommended to parents for their children," she said. "There needs to be a family-oriented approach to cardiovascular prevention and to addressing these risk factors."

Co-authors are Katherine Morrison, M.D. and Eva Lonn, M.D.

This study was funded by the Population Health Research Institute (PHRI), McMaster University, Hamilton, Ontario, Canada.

Statements and conclusions of study authors that are published in the American Heart Association scientific journals are solely those of the study authors and do not necessarily reflect association policy or position. The American Heart Association makes no representation or warranty as to their accuracy or reliability.

NR06-1095 (SS06/Piran)

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